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February 19, 1998

Box Patent Application

BY HAND DELIVERY

Assistant Commissioner for Patents
Washington, D.C. 20231

Re: U.S. Non-Provisional Utility Patent Application
Appl. No.: To Be Assigned; Filed: February 19, 1998
For: Digital Still Camera Capable of Telecommunication
Inventor: Masahide TANAKA and Katsutoshi ITO
Our Ref: 06205.0010

Sir:

The following documents are forwarded herewith for appropriate action by the U.S. Patent and Trademark Office:

1. U.S. Utility Patent Application entitled:
Digital Still Camera Capable of Telecommunication

and naming as inventors:
Masahide TANAKA and Katsutoshi ITO

the application consisting of:

a. a specification containing:

(i) **18** pages of description prior to the claims;
(ii) **7** pages of claims (22 claims);
(iii) a one (1) page abstract;

b. 3 sheets of drawings: (Figures 1, 2 and 3);

c. an original executed Combined Declaration and Power of Attorney;

d. an original executed Assignment to Samsung Aerospace Industries, Ltd., recordation of which is hereby respectfully requested;

e. an Information Disclosure Statement (IDS);

f. Form PTO-1449 (1 page) with 2 accompanying documents;

g. our check no. 154297 for $956.00 to cover:

$ 916.00 filing fee for patent application;
$ 40.00 assignment recordation fee;

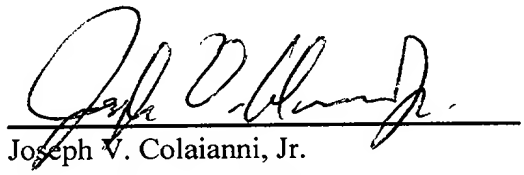
2. two (2) return postcards.

It is respectfully requested that, of the two attached postcards, one be stamped with the filing date of these documents and returned to our courier, and the other, prepaid postcard, be stamped with the filing date and unofficial application number and returned as soon as possible.

Applicant hereby claims foreign priority benefits under Title 35, United States Code, § 119 to Korean patent Application Nos. 97-29444 filed on June 30, 1997.

The U.S. Patent and Trademark Office is hereby authorized to charge any fee deficiency, or credit any overpayment, to our Deposit Account No. 08-3038. A duplicate copy of this letter is enclosed.

Respectfully submitted,



Joseph V. Colaianni, Jr.
Registration No. 39,948

Enclosures

PTO/SB/05 (12/97)
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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	06205.0010	Total Pages	
First Named Inventor or Application Identifier			
Masahide TANAKA			
Express Mail Label No.			

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents

ADDRESS TO: Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231

1. ☒ Fee Transmittal Form (Form PTO-1082)
(Submit an original and a duplicate for fee processing)

2. ☒ Specification [*Total Pages* 26]
(preferred arrangement set forth below)
- Descriptive title of the Invention
- Cross References to Related Applications
- Statement Regarding Fed sponsored R&D
- Reference to Microfiche Appendix
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings (if filed)
- Detailed Description
- Claims
- Abstract of the Disclosure

3. ☒ Drawing(s) *(35 USC 113)* [*Total Sheets* 3]

4. Oath or Declaration [*Total Pages* 3]
a. ☒ Newly executed (original or copy)
b. ☐ Copy from a prior application (37 CFR 1.63(d))
(for continuation/divisional with Box 17 completed)
[Note Box 5 below]
i. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).

5. ☐ Incorporation By Reference *(useable if Box 4b is checked)*
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.

6. ☐ Microfiche Computer Program *(Appendix)*

7. Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
a. ☐ Computer Readable Copy
b. ☐ Paper Copy (identical to computer copy)
c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

8. ☒ Assignment Papers (cover sheet & document(s))
9. ☐ 37 CFR 3.73(b) Statement *(when there is an assignee)* ☒ Power of Attorney
10. ☐ English Translation Document *(if applicable)*
11. ☒ Information Disclosure Statement (IDS)/PTO-1449 ☒ Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☒ Return Receipt Postcard (MPEP 503) (Two)
(should be specifically itemized)
14. ☐ Small Entity Statement(s) ☐ Statement filed in prior application, Status still proper and desired
15. ☒ Certified Copy of Priority Document(s)
(if foreign priority is claimed)
16. ☐ Other:

17. **If a CONTINUING APPLICATION,** *check appropriate box and supply the requisite information:*
☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No: /

18. CORRESPONDENCE ADDRESS

☐ *Customer Number or Bar Code Label* *(Insert Customer No. or Attach bar code label here)* *or* ☒ *Correspondence address below*

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Burden Hour Statement. This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Box Patent Application, Washington, DC 20231

FORM PTO-1082

HOWREY & SIMON
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(202) 783-0800

Attorney Docket No. 06205.0010

ASSISTANT COMMISSIONER FOR PATENTS
Washington, D.C. 20231

Sir:

Transmitted herewith for filing is the patent application of
Inventors: **Masahide TANAKA, and Katsutoshi ITO**
For: **Digital Still Camera Capable of Telecommunication**

Enclosed are:

x 3 sheets of informal drawings. (Figs. 1, 2 and 3)
x An assignment of the invention to SAMSUNG AEROSPACE INDUSTRIES, LTD.
x Form PTO-1595.
x Certified copies of KOREAN APPLICATION NO. 97-29444
— An associate power of attorney.
— A verified statement to establish small entity status under 37 CFR 1.9 and 37 CFR 1.27.
x Executed Power of Attorney from Assignee
x Executed Declaration for Patent Application.

The filing fee has been calculated as shown below:

	(Col. 1)	(Col. 2)	SMALL ENTITY			OTHER THAN A SMALL ENTITY	
FOR	NO. FILED	NO. EXTRA	RATE	FEE	OR	RATE	FEE
BASIC FEE				$ 395.00	OR		$ 790.00
TOTAL CLAIMS	22 -20 =	* 2	x 11 =		OR	2 x 22 =	44.00
INDEP. CLAIMS	4 -3 =	* 1	x 41 =		OR	1 x 82=	82.00
☐ MULTIPLE DEPENDENT CLAIM PRESENTED			+ 135 =		OR	+ 270 =	
			TOTAL		OR	TOTAL	$ 916.00

*If the difference in Col. 1 is less than zero, enter "0" in Col. 2

— Please charge my Deposit Account No. 08-3038 in the amount of $_____. A duplicate copy of this sheet is attached.

xx A check in the amount of $ 956.00 to cover the filing and recordation fee is enclosed.

xx The U.S. Patent and Trademark Office is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 08-3038. A duplicate copy of this sheet is attached.

xx Any additional filing fees required under 37 CFR 1.16.
xx Any patent application processing fees under 37 CFR 1.17.

— The U.S. Patent and Trademark Office is hereby authorized to charge payment of the following fees during the pendency of this application or credit any overpayment to Deposit Account No. 08-3038. A duplicate copy of this sheet is enclosed.

— Any patent application processing fees under 37 CFR 1.17
— The issue fee set in 37 CFR 1.18 at or before mailing of the Notice of Allowance, pursuant to 37 CFR 1.311(b).
— Any filing fees under 37 CFR 1.16 for presentation of extra claims.

Date February 19, 1998

Joseph V. Colaianni, Jr. (Reg. No. 39,948)

DIGITAL STILL CAMERA CAPABLE OF TELECOMMUNICATION

BACKGROUND OF THE INVENTION

(a) Field of the Invention

The present invention relates to a digital still camera which converts an optical image into a digital electronic signal representative of the image and stores the digital electronic signal, and more particularly to a still camera capable of communicating to a remote site by means of a wireless telephone system.

(b) Description of the Related Art

In the field of digital still cameras, various types of communication of digital electronic image signals have been proposed. One of the typical proposals is to transmit the digital electronic image signal to a remote device, such as a computer, by connecting a digital still camera to a wireless telephone through a MODEM, and transmitting the signal to the remote device connected to a telephone line.

Japanese Laid Open Patent Application Nos. 6-133081 and 6-268582 disclose a digital still camera and a wireless telephone contained in a single housing. The purpose of combining the digital still camera and the wireless telephone in a single housing is to conserve memory to store the digital electronic image signals. In other words, the digital electronic image signals are transmitted from the digital still camera to a computer at a remote site with a large memory.

Such digital electronic image signals otherwise have to be stored in a memory device included in the digital still camera itself. The devices disclosed in Japanese Laid Open Patent Application Nos. 6-133081 and 6-268582 transmit image information taken by a digital still camera to a computer at a remote site, but have disadvantages because they cannot receive image information from a remote site. In addition, the devices are expensive and inconvenient because they require a large memory and require a long time to transmit image data either in a regular format or in a compressed format.

SUMMARY OF THE INVENTION

One object of the present invention is to provide a digital still camera including in a single housing a wireless telephone, which can receive and display a digital electronic image signal generated by another digital still camera. The digital still camera of the present invention receives digital electronic image signals generated by another digital still camera of a remote site without a large memory .

Another object of the present invention is to provide a digital still camera that can receive an audio and image signals simultaneously.

Another object of the present invention is to provide a digital still camera capable of telecommunication, with which a user can not only talk in an ordinary manner, but also may view the displayed still image while talking.

A further object of the present invention is to provide a digital still camera that can communicate both audio and image signals at the same

time.

Another object of the present invention is to provide a digital camera that can communicate with various types of telephones including astandard one that cannot receive an image signal.

Another object of the present invention is to provide a digital still camera that can transfer audio and image signals to the same type of digital still camera in a short period of time.

Another object of the present invention is to provide a digital still camera that can communicate with various types of remote devices including astandard computer.

In order to attain these objects, the digital still camera of present invention includes:

a converting device which converts an optical image into digital electronic image signals;

a receiver which receives an electromagnetic signal generated in accordance with a wireless telephone system;

a modifying unit which modifies the electromagnetic signal into a digital electronic still image signal; and

a device which alternatively displays a still image on the basis of the digital electronic signal from the converting device or from the modifying unit.

Other objects and various advantages according to the present invention will be better understood by means of the following detailed descriptions of the preferred embodiment in conjunction with the attached drawing.

BRIEF DESCRIPTION OF THE DRAWINGS

The above object and feature of the present invention will be apparent from the following description of the preferred embodiment with reference to the accompanying drawings.

FIG. 1 is a perspective view of an embodiment of a digital still camera according to the present invention;

FIG. 2 is a block diagram showing an embodiment of the digital still camera according to the present invention; and

FIG. 3 is a block diagram showing a transmitting/receiving state of the digital still camera according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The above objects and features of the present invention will be apparent from the following description of the preferred embodiments with reference to the accompanying drawings.

As shown in Fig. 1, a digital still camera according to an embodiment of the present invention includes a microphone 2 and a speaker 3 in a single housing.

Further, the digital still camera includes a display device (color liquid crystal display) 4 of a reflection type without back light illumination to save power , which displays a color image of 60,000 pixels. The display device 4 functions as a touch panel of dial buttons for a digital phone.

A camera lens 5 can rotate and is normally aimed in a direction indicated by arrow D that is not in the line of sight of the users who observe

the display panel 4.However, the lens 5 can rotate so that it can be in the line of sight of the users when they watch the display panel 4. The lens is illustrated by the broken lines in FIG. 1.

The speaker 3 and the microphone 2 can function in a close mode or in a remote mode. In a close mode, the users put their ears and mouths close to the speaker 3 and microphone 2. On the other hand, in a remote mode, the users can put their ears and mouth relatively remote from the speaker and the microphone.

A manual switch 6 turns on the display device 4 to display a still image. The speaker 3 and the microphone 2 automatically change into the remote mode when the manual switch 6 turns on the display device 4.

An image receiving request switch 7 requests the remote device to transfer an image. An input switch 8 activates a touch panel on the display 4, which can accept an image input by pen. The button 9 is a shutter release button.

In FIG. 2, a thick line represents the information flow and a thin line represents the flow of control signals.

In more detail, the digital still camera according to an embodiment of the present invention includes

a CCD camera 10 for converting an optical image into digital electronic image signals;

a transmitting/receiving exchanger 11 for receiving or transmitting an electromagnetic signals generated in accordance with a wireless telephone system;

a demodulator 12 for demodulating the received electromagnetic signals, which is connected to the output of the transmitting/receiving exchanger 11;

an A/D converter 13 for converting the electromagnetic signals into digital electronic still image signals, which is connected to the output of the demodulation unit 12;

a switching unit 15 connected to the output of the A/D converter 13;

an extracting unit 22 for extracting still image signal components and audio signal components from the digital electronic signals, which is connected to the output of the switching unit 15;

a memory 14 for storing the still image signal from the extracting unit 22 or the digital still image signal from the CCD camera 10;

a speaker 3 for generating audio signals in response to the electromagnetic signals of the wireless telephone system received by the transmitting/receiving exchanger 11 and the demodulator 12;

a first mode changing unit 18 for activating the speaker 3 in a close or remote mode;

a first distinction unit 16 for detecting an image signal from the digital electronic signal converted by A/D converter 13 and automatically controlling the switching unit 15 from a first mode to a second mode;

a display control unit 20 for controlling the display device 4 to display whether the received electromagnetic signal contains a still image signal or audio signal, which is connected to the output of the first distinction unit 16;

a first inhibition unit 17 for making the first mode changing unit 18

"OFF" to restrain the speaker 3 from generating a voice signal in the second mode, which is connected to the output of the first distinction unit 16;

an image receiving request switch 7 for operating the switching unit 15 from a first mode to a second mode, which is connected to the input of the switching unit 15;

a telephone number receiving unit 38 for receiving a telephone number signal generated in accordance with the wireless phone system from another remote device, such as another digital still camera or a handy phone, which is connected to the output of the A/D converter 13;

an answer back receiving unit 40 for receiving a second answer back signal generated in accordance with the wireless phone system from another remote device, which is connected to the output of the A/D converter 13; and

an auto activating unit 19 connected to the output of the first distinction unit 16.

In addition to the above-mentioned construction for receiving an electromagnetic signal from the remote device and outputting a corresponding audio signal and displaying a corresponding image, the digital still camera according to an embodiment of the present invention further includes:

a microphone 2 for converting a voice into an electronic audio signal;

a second mode changing unit 21 for activating the microphone 2 in a first/second mode;

a first modification unit 41 for forming a still image signal of a less number of pixel to be contained in a still image signal from the memory 14;

a combination unit 23 for combining the electronic audio signal from the second mode changing unit 21 and the still image signal from the first modification unit 41;

a first mixing unit 34 for mixing the still image signal from the first modification unit 41 and an input signal by pen when an input switch 8 is activated "ON";

a selecting unit 24 for outputting alternatively one of the signals from the combination unit 23 and from the first mixing unit 34;

a dial 28 for dialing a telephone number designating another remote device, such as a type of a touch panel;

a telephone number memory 29 for storing many telephone numbers;

a first comparator 30 and second comparator 47 for comparing the telephone number dialed by the dial 28 with the specific telephone number stored in memory 29;

a second inhibition unit 31 for inhibiting the combination unit 23 from combining the electronic audio signal from the second mode changing unit 21 and the still image signal from the first modification unit 41 when the dialed telephone number designating another remote device is the specific telephone number stored in memory 29;

a control unit 43 for controlling the first modification unit 41, which is connected to the second comparator 47;

a second modification unit 35 for judging whether the still image signal from the memory 14 is a first type or a second type so that it can determine whether to reduce the number of pixels to output in the display 4;

an answer back transmitting unit 39 for generating a first answer back signal indicating the receipt of an electromagnetic signal transmitted from another remote device, which is connected to the output of the telephone number receiving unit 38;

a second mixing unit 25 for mixing signals from the selecting unit 24, the answer back transmitting unit 39 and the dial 28;

a D/A converter 26 for converting the signal from the second mixing unit 25 into an analog signal;

a modulation unit 27 for modulating the signal from the D/A converter 26 and outputting it to the transmitting/receiving exchanger 11; and

an image transmitting request switch 32 connected to the input of the second inhibition unit 31.

The first modification unit 41 includes a first reducing unit 42 for reducing the number of pixels of the still image signal from the memory 14. The second modification unit 35 includes a second distinction unit 37 for judging whether the still image signal from the memory 14 is a first type or a second type and a second reducing unit 36 for reducing the number of pixels of the still image signal from the memory 14 and outputting the resultant image to the display device 4.

The digital still camera according to an embodiment of the present invention further includes a memory card 46 and an input/output interface unit 44 for outputting an image signal from such a memory card 46 to the memory 14.

The transmitting/receiving exchanger 11 is able to amplify the transmitted or received electromagnetic signals as well as to transmit those signals.

The input/output interface 44 serves as a means for extracting the digital electromagnetic signal from the memory 14, and includes means for connecting itself to an external device.

The memory card 46 also serves as a means for extracting the digital electronic signal from the memory 14, and is detachably inserted into the digital still camera. In order words, a slot for memory card 46 serves as a means for removing the digital still image memory from the digital still camera.

The digital still camera according to the embodiment of the present invention, as shown in FIG. 3, receives and displays a still image signal and an audio signal as an electromagnetic signal generated in accordance with a wireless telephone system from a remote device.

Also, the digital still camera according to the embodiment of the present invention converts an optical image into an electronic still image signal and transmits the electronic still image signal to a remote device such as another digital still camera. At this time the digital still camera does not transmit a still image signal when a telephone number designating the remote device matches a specific telephone number stored in memory, and transmits a still image signal when a telephone number designating the remote device does not match a specific telephone number stored in memory.

The above-mentioned operation of the digital still camera according to embodiments of the present invention will be explained in detail referring to FIG. 2.

First, the following is an explanation of how an electromagnetic signal containing a still image signal generated in accordance with a wireless phone system from another remote device is received and displayed, and how an electromagnetic signal containing an audio signal generated in accordance with a wireless phone system from another remote device is received and outputted.

Referring to FIGs. 2 and 3, an antenna of the digital still camera of the present invention receives an electromagnetic signal from a remote device, such as another digital still camera, and a transmitting/receiving exchanger 11 changes to a receiving mode and outputs the received electromagnetic signal to the demodulator 12.

The demodulator 12 demodulates the electromagnetic signal and outputs it to the A/D converter 13. The A/D converter 13 converts the demodulated electromagnetic signal into a digital electronic signal.

When a telephone number receiving unit 38 receives from a remote device a telephone number identifying a digital still camera of the present invention through the transmitting/receiving exchanger 11, the demodulator 12 and the A/D converter 13, an answer back transmitting unit 39 outputs a first answer back signal identifying the digital still camera. The first answer back signal is transmitted to the remote device by the transmitting/receiving exchanger 11 through a second mixing unit 25, a D/A converter 26 and a

modulator 27.

The telephone number receiving unit 38 automatically activates the digital still camera of the present invention to receive a transmitted signal in response to the telephone number as an electromagnetic signal generated in accordance with a wireless telephone system.

The signal from the A/D converter 13 is input to a switching unit 15 and a first distinction unit 16 respectively, after the electromagnetic signal containing a still image signal from the remote device is transmitted and is processed as described above.

The first distinction unit 16 distinguishes a still image signal from the digital electronic signal containing an audio signal and automatically switches the switching unit 15 from first mode to second mode. At the same time, the first distinction unit 16 outputs a corresponding control signal to the first inhibition unit 17.

At this time, a display device 4 indicates with characters or symbols that the device has received a still image or a still image with audio signals.

The switching unit 15 is provided to switch between a first mode and a second mode. The first mode generates a voice through speaker 3 and the second mode displays a still image on a display device 4 in response to the receiving digital signal.

The digital still camera according to the embodiment of the present invention is set in an automatic mode. In an automatic mode, the first distinction unit 16 automatically switches the switching unit 15 from first mode to the second in order to receive electromagnetic signals of a still image

signal from the remote device.

The auto activating unit 19 is effective in the automatic mode for automatically activating the functions of receiving the electromagnetic signals of a still image in response to the telephone number identifying the digital still camera of the present invention when the first distinction unit 16 distinguishes the electromagnetic signals of a still image.

In a manual mode, the first distinction unit 16 does not automatically switch the switching unit 15 from the first mode to the second mode. The switching unit 15 can be activated from first mode to second mode by a manual request switch 7 in a manual mode. Also, in a manual mode, a manual switch can turn on the display device 4 and it can also switch a first mode changing unit 18 and a second mode changing unit 21 from the first mode to the second mode.

The switching unit 15 outputs the digital electronic signal from the A/D converter 13 to a memory 14 when the first inhibition unit 16 set the device in the second mode. At the same time, the first inhibition unit 17 turns off the first mode changing unit 18 to keep the speaker 3 from generating an audio signal in the second mode.

The digital electronic signal of a still image signal into the memory unit 14 by the switching unit 15 is output to a display device 4 through a second modification unit 35.

An example of talking on the phone while watching an image on display device 4 is the case where the device receives audio signals while receiving a still image at the same time. In this case, a combination of still

image and audio signal is received as an electromagnetic signal generated in accordance with a wireless phone system.

When the device receives an electromagnetic signal containing a still image signal and audio signal, the first distinction unit 16 detects an audio signal and sets the switching unit 15 to the first mode. The switching unit 15 outputs the electromagnetic signal to an extracting unit 22.

From the combination signals of both a still image and an audio signal, the extracting unit 22 extracts an audio signal components to control the speaker 3 and still image signal components to control the display device 4.

At this time, the first inhibition unit 17 sets the first mode changing unit 18 "ON" and the audio signal extracted from the extracting unit 22 is input to the first mode changing unit 18 and the still image signal extracted from the extracting unit 22 is input to a memory 14. The audio signal is output to a speaker 3 through the first mode changing unit 18, and the still image signal is processed by the modification unit 35 and is displayed on display device 4.

Accordingly, the user of the digital still camera can watch a still image and hear a voice from a remote device because the display device 4 can display the still image while the speaker 3 generates the audio signal at the same time.

Following is a description of how a still image signal and an audio signal taken by the digital still camera of the present invention are transmitted to another remote device.

The user of the digital still camera designates a telephone number of a remote device, such as a wireless telephone, by activating a dial 28, which is formed as a touch panel in display device 4. The dialed telephone number is transmitted to a corresponding remote device by transmitting/receiving exchanger 11 via second mixing unit 25, D/A converter 26, and modulator 27 as an electromagnetic signal generated in accordance with a wireless phone system.

The D/A converter 26 converts digital signals corresponding to the dialed telephone number into analog signals and the modulator 27 modulates the analog signal, so that the modulated signal is transmitted to a corresponding remote device by the transmitting/receiving exchanger 11 as an electromagnetic signal generated in accordance with a wireless phone system.

The dialed telephone number is also input to the first comparator 30 and the second comparator 47.

When a user of the digital still camera speaks into the microphone 2, the microphone 2 converts the speech into electronic audio signals and the signals are input to the second mode changing unit 21. The second mode changing unit 21 outputs the electronic audio signals to the combination unit 23 and the electronic audio signals are transmitted by the transmitting/receiving exchanger 11 via the D/A converter 26 and the modulator 27.

The combination unit 23 is capable of combining a digital still image signal taken by a CCD camera while the audio signal to be transmitted.

Therefore, the audio signal and the still image signal can be transmitted at the same time.

First, a still image signal taken by a CCD camera is stored in a memory 14 and the stored still image signal is output to a first modification unit 41.

The still image signal transferred to the first modification unit 41 is output to a combination unit 23 and the combination unit 23 combines the audio signals with the still image signal and output the combination according to the control of the second inhibition unit 31.

Speaking in more detail, the first comparator 30 compares the dialed telephone number with a telephone number stored in a telephone number memory 29 and outputs a comparison result to a second inhibition unit 31.

The phone number memory 29 is further capable of storing at least one telephone number of each of a first and a second type of a remote device. The first type of remote device is not able to receive a still image, and the second type of remote device is able to receive a still image.

The second inhibition unit 31 inhibits the combination unit 23 from combining the electronic audio signal with a digital still image signal from a first modification unit 41 when the dialed telephone number designating a remote device matches the telephone numbers of the first type of remote device stored in the telephone number memory 29. In this case, the second inhibition unit 31 tells the selecting unit 24 not to select and output a still image signal.

On the contrary, when the dialed telephone number designating a remote device matches the telephone number of the second type of remote device stored in the telephone number memory 29, the second inhibition unit 31 allows the combination unit 23 to combine the electronic audio signal with a digital still image signal from a first modification unit 41. In this case, the second inhibition unit 31 controls a selecting unit 24 so as to select and output a still image signal.

Thus, the combination of the electromagnetic signal containing the still image with the audio signal can be transmitted when the dialed telephone number matches the specific telephone number of the remote device having a function capable of receiving a still image signal.

However, the second inhibition unit 31 controls the combination unit 23 and the selecting unit 24 to combine an audio signal with a still image signal when an image transmitting request switch 32 is activated.

Accordingly, only when the image transmitting request switch 32 is activated or the dialed telephone number matches the telephone numbers of the second type of remote devices, the electromagnetic signal containing the still image and audio signals can be combined.

The signal containing audio signals from the microphone 2 and a still image signal taken by a CCD camera is transmitted to another remote device capable of receiving a still image signal through D/A converter 26, the modulator 27 and the transmitting/receiving exchanger 11.

As described above, the present invention, in accordance with the embodiment, provides a digital still camera capable of telecommunication

including in one inseparable housing a wireless telephone, which can receive and display a digital electronic signal indicative of a still image taken by another digital still camera.

Also, the present invention provides a digital still camera that can suitably receive the audio signal and the image signal without any confusion and a user can talk not only in an ordinary manner, but also with the displayed still image being displayed and watched.

Further, the present invention provides a digital still camera that can communicate both the audio signal and the image signal at the same time and can not only communicate with various types of telephone including an ordinary one that are not capable of receiving image signals but also communicate with the same type of digital still camera with a minimum communication time.

While it has been shown and described what are at present the embodiments of the invention, it will be obvious to those skilled in the art that various changes and modifications can be readily made therein without departing from the scope and sprit of the invention as defined by the append.

WHAT IS CLAIMED IS:

1. A digital still camera capable of telecommunication comprising:

a device which converts an optical image into a digital electromagnetic signal indicative of a still image;

a receiver which receives an electromagnetic signal generated in accordance with a wireless telephone system;

a modifying unit which modifies said electromagnetic signal into a digital electronic signal indicative of a still image; and

a device which alternatively displays a still image on the basis of the digital electronic signal from the converting device or from the modifying unit.

2. A digital still camera capable of telecommunication in accordance with claim 1, further comprising a memory which alternatively stores the digital electronic signal from the converting device or from the modifying unit, the displaying device being responsive to the memory.

3. A digital still camera capable of telecommunication in accordance with claim 1, wherein the displaying device includes a reflection type color liquid crystal display device without back light illumination.

4. A digital still camera capable of telecommunication in accordance with claim 1, further comprising a device for automatically activating the receiver responsive to an electromagnetic signal generated in accordance with a wireless telephone system identifying the digital still camera.

5. A digital still camera capable of telecommunication in accordance with claim 1, further comprising a speaker for generating an audio signal in response to the electromagnetic signal generated in accordance with a wireless telephone system received by the receiver.

6. A digital still camera capable of telecommunication in accordance with claim 5, further comprising a device responsive to the receiver for controlling the displaying device to indicate whether the received electromagnetic signal contains a still image signal or an audio signal.

7. A digital still camera capable of telecommunication in accordance with claim 5, further comprising a device for switching a first mode of generating the audio signal via the speaker in response to the electromagnetic signal received by the receiver to a second mode of displaying the image on the displaying device in response to the electromagnetic signal received by the receiver.

8. A digital still camera capable of telecommunication in accordance with claim 7, further comprising a device for inhibiting the speaker from generating the audio signal in the second mode.

9. A digital still camera capable of telecommunication in accordance with claim 7, further comprising a device for distinguishing an electromagnetic

signal containing a still image signal from an electromagnetic signal containing an audio signal to thereby automatically controlling the switching device.

10. A digital still camera capable of telecommunication in accordance with claim 7, further comprising a device for manually controlling the switching device.

11. A digital still camera capable of telecommunication in accordance with claim 5, further comprising a device for extracting an audio signal component from an electromagnetic signal containing both a still image signal and an audio signal to control the speaker, and a device for extracting a still image signal component from the same electromagnetic signal to control the displaying device, whereby the displaying device is capable of displaying the still image while the audio signal is being generated from the speaker.

12. A digital still camera capable of telecommunication in accordance with claim 11, further comprising a microphone for converting sound into an electronic signal, a device for combining the digital electronic signal indicative of a still image with the electronic audio signal to form a combination signal, and a device for transmitting the combination signal as an electromagnetic signal generated in accordance with a wireless telephone system, whereby the still image is capable of being transmitted while the audio signal is transmitted by the transmitting device.

13. A digital still camera capable of telecommunication in accordance with claim 12, further comprising a device responsive to the converting device, for storing the digital electromagnetic signal indicative of a still image, wherein the combining device is responsive to the memory to thereby combine the digital electronic signal indicative of a still image converted prior to the combining operation.

14. A digital still camera capable of telecommunication in accordance with claim 12, wherein the converting device is capable of converting an optical image into a digital electronic signal indicative of a still image while the audio signal is transmitted by the transmitting device.

15. A digital still camera capable of telecommunication in accordance with claim 12, further comprising a device for designating a remote device with a telephone number transmitted by the transmitting device as an electromagnetic signal generated in accordance with a wireless telephone system, a memory device for storing at least one specific telephone number, and a device for preventing the combining device form combining the digital electronic signal indicative of a still image with the electronic audio signal when the telephone number designating the remote device coincides with a specific telephone number.

16. A digital still camera capable of telecommunication in accordance with claim 5, further comprising a microphone for converting sound into an electronic audio signal, wherein the speaker and the microphone have a first mode function in which they are used with the ear and the mouth of a user respectively close thereto and a second mode function in which they are used with the ear and the mouth of a user respectively remote therefrom.

17. A digital still camera capable of telecommunication in accordance with claim 16, further comprising a manual switch for activating the display device, wherein the speaker and the microphone are automatically changed into the second mode when the display means is activated by the manual switch.

18. A digital still camera capable of telecommunication in accordance with claim 1, wherein the optical image converting device is directed toward an object located at a position where the display device is not observable.

19. A digital still camera capable of telecommunication in accordance with claim 18, wherein the optical image converting device is capable of being directed toward an object located at a position where the display device is observable.

20. A digital still camera capable of telecommunication comprising:

a device which converts an optical image into a digital electronic signal;

a microphone for converting sound into an electronic audio signal ;

a device which selects one of the digital electronic signal indicative of the still image and the electronic audio signal;

a first transmitter which transmits an electromagnetic signal generated in accordance with a wireless telephone system to designate a remote device having a telephone number;

a second transmitter which transmits the signal selected by the selecting device as an electromagnetic signal generated in accordance with a wireless telephone system containing the still image signal or the audio signal to the designated remote device;

a memory which stores at least one specific telephone number; and

a device for preventing the selecting device from selecting the digital electronic signal indicative of the still image when the telephone number designating the remote device coincides with the specific telephone number.

21. A digital still camera capable of telecommunication comprising:

a device which converts an optical image into a digital electronic signal indicative of a still image;

a microphone for converting sound into an electronic audio signal;

a device which selects one of the digital electronic signal indicative of the still image and the electronic audio signal;

a transmitter which transmits the signal selected by the selecting

device as an electromagnetic signal generated in accordance with a wireless telephone system containing the still image signal or the voice signal; and

a device which prevents the selecting device from selecting the digital electronic signal indicative of the still image unless the selection is requested by a manual operation.

22. A digital still camera capable of telecommunication comprising:

a device which converts an optical image into a digital electronic signal indicative of a still image;

a memory which stores at least one specific telephone number;

a first transmitter which transmits an electromagnetic signal generated in accordance with a wireless telephone system to designate a remote device with a telephone number;

a second transmitter which transmits the digital electronic signal indicative of the still image as an electromagnetic signal generated in accordance with a wireless telephone system containing the still image; and

a device which allows the transmission of the electromagnetic signal containing the still image when the telephone number designating the remote device coincides with the specific telephone number in the memory.

ABSTRACT OF THE DISCLOSURE

A digital still camera capable of telecommunication includes a device which converts an optical image into a digital electromagnetic signal indicative of a still image, a receiver which receives an electromagnetic signal generated in accordance with a wireless telephone system, a modifying unit which modifies the electromagnetic signal into a digital electronic signal indicative of a still image, and for a device which alternatively displays a still image on the basis of the digital electronic signal from the converting device or from the modifying unit

FIG.1

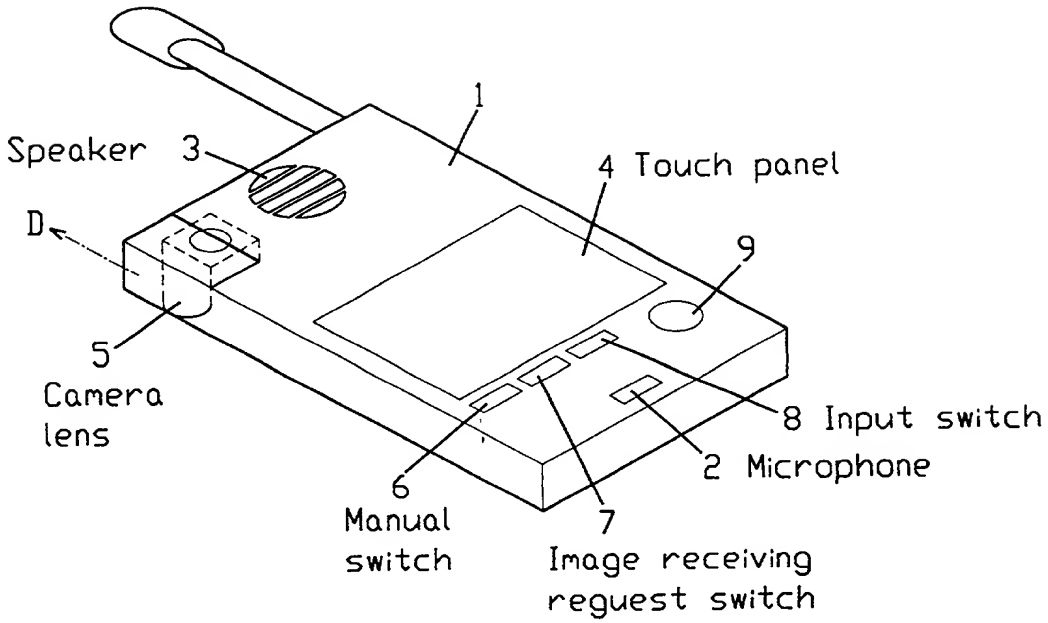

1
Speaker 3
4 Touch panel
D
9
5
Camera
lens
8 Input switch
2 Microphone
6
Manual
switch
7
Image receiving
reguest switch

FIG.2

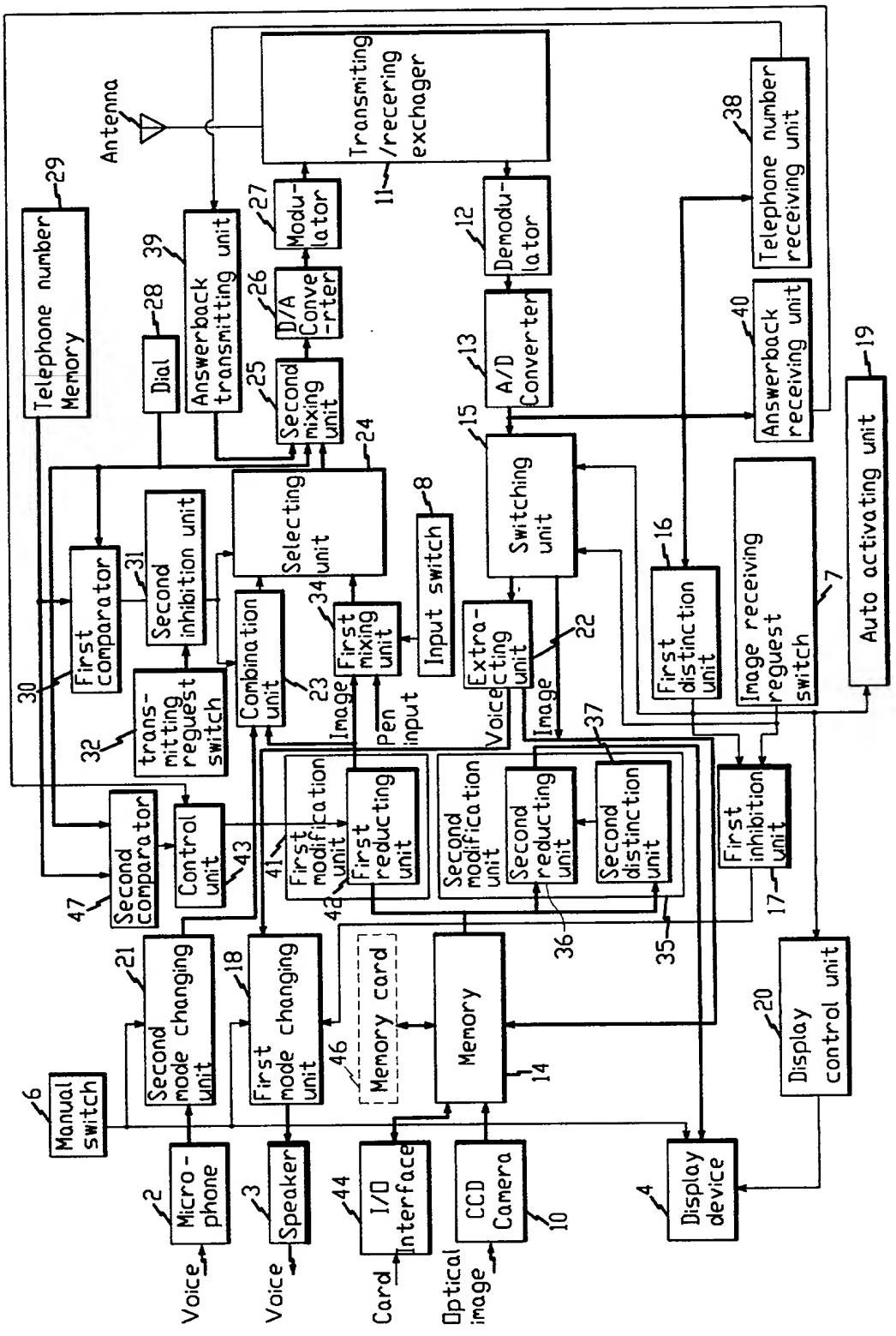
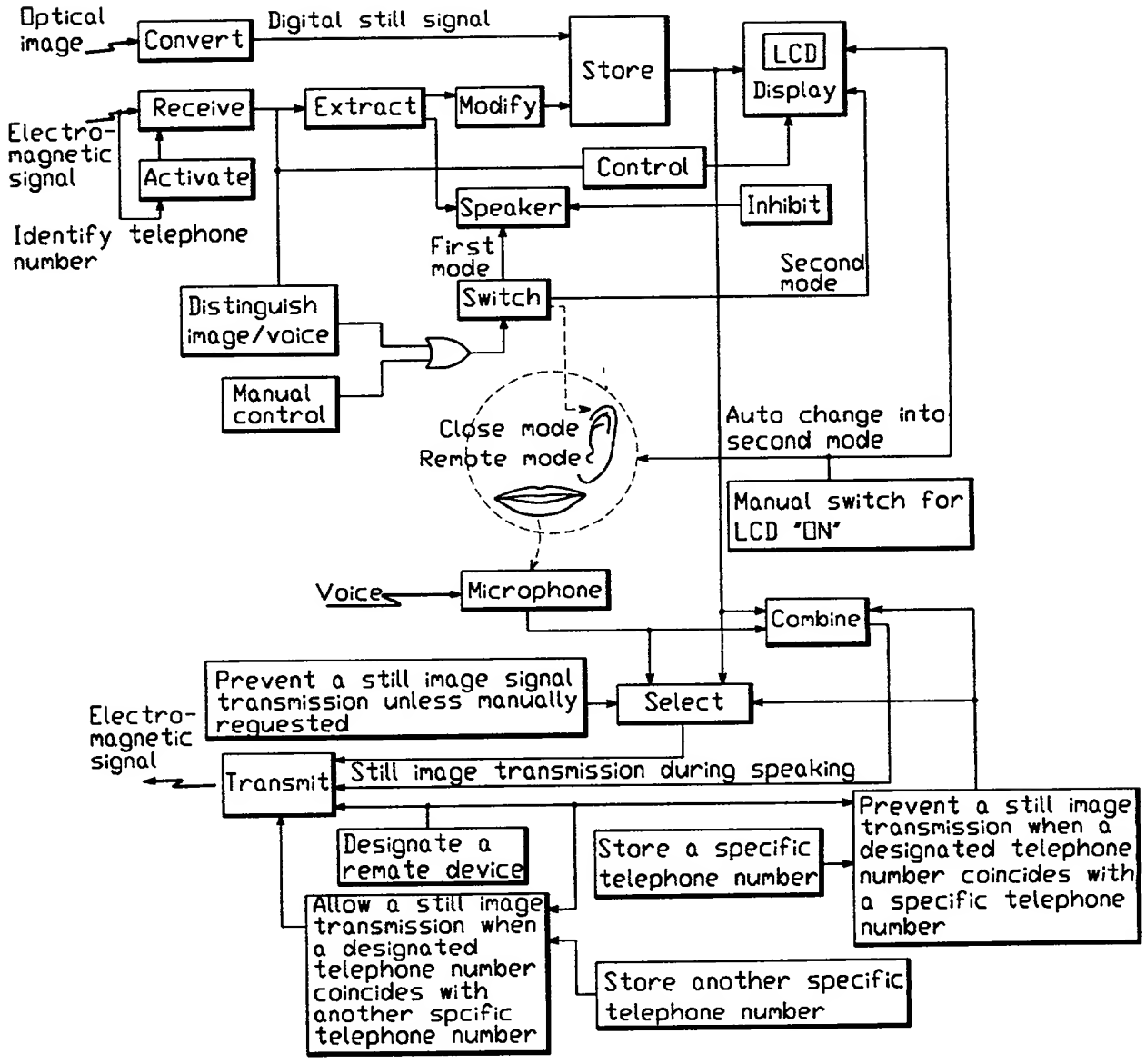

Antenna
Transmiting /recering exchager
11
Telephone number Memory
29
Dial
28
Answerback transmitting unit
39
Modu-lator
27
D/A Conve-rter
26
Second mixing unit
25
Demodu-lator
12
Telephone number receiving unit
38
Answerback receiving unit
40
A/D Converter
13
Auto activating unit
19
Switching unit
15
Selecting unit
24
Input switch
8
First comparator
30
Second inhibition unit
31
trans-mitting reguest switch
32
Combination unit
23
First mixing unit
34
Extra-cting unit
22
First distinction unit
16
Image receiving reguest switch
7
Second comparator
47
Control unit
43
First modification unit
41
First reducting unit
42
Second modification unit
Second reducting unit
Second distinction unit
37
First inhibition unit
17
36
35
Second mode changing unit
21
First mode changing unit
18
Memory card
46
Memory
14
Display control unit
20
Manual switch
6
Micro-phone
2
Speaker
3
I/O Interface
44
CCD Camera
10
Display device
4
Voice
Voice
Card
Optical image
Image
Pen input
Voice
Image
Flow of information
Flow of control signal

FIG.3


Optical image
Convert
Digital still signal
Store
LCD Display
Receive
Extract
Modify
Electro-magnetic signal
Activate
Control
Speaker
Inhibit
Identify telephone number
First mode
Second mode
Switch
Distinguish image/voice
Manual control
Close mode
Remote mode
Auto change into second mode
Manual switch for LCD "ON"
Voice
Microphone
Combine
Prevent a still image signal transmission unless manually requested
Select
Electro-magnetic signal
Transmit
Still image transmission during speaking
Designate a remote device
Store a specific telephone number
Prevent a still image transmission when a designated telephone number coincides with a specific telephone number
Allow a still image transmission when a designated telephone number coincides with another spcific telephone number
Store another specific telephone number

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s):

Serial No.: **Group Art Unit:**

Filed: **Examiner:**

For:

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

S I R:

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am an original, first, and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter that is claimed and for which a patent is sought on the invention entitled DIGITAL STILL CAMERA CAPABLE OF TELECOMMUNICATION

_____, the specification of which is attached hereto unless the following box is checked [ ] filed on_____ as Application Serial No. _____ and amended on_____.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37,Code of Federal Regulations, §1.56(a).

PRIOR FOREIGN APPLICATION(S)

I hereby claim the benefit under title 35, United States Code, §119 of any foreign application(s) listed below and, insofar as this application discloses and claims subject matter in addition to that disclosed in the prior foreign application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56, which became available between the filing date of the prior application and the national or PCT international filing date of this application:

Country	Application No.	Date of Filing (Month, Day, Year)	Date of Issue (Month, Day, Year)	Priority Claimed 35 U.S.C. §119
Korea	97-29444	June 30, 1997		[ ] Yes [ ] No. [ ] Yes [ ] No. [X] Yes [ ] No.

PRIOR UNITED STATES APPLICATION(S)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as this application discloses and claims subject matter in addition to that disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56, which became available between the filing date of the prior application and the national or PCT international filing date of this application:

Application No.	Date of Filing (Month, Day, Year)	Status

POWER OF ATTORNEY

As a named inventor, I hereby appoint the following attorneys with full power of substitute and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

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I declare that all statements made herein of my own knowledge area true and all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statement may jeopardize the validity of the application or any patent issuing thereon.

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